WEB APPLICATION OF caBENCH-TO BEDSIDE V3.1

End User Manual

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Contents

About This Guide

This section introduces you to the caB2B Web Application manual. It contains the following topics:

- *Purpose*
- *Typical User*
- *Topics Covered*
- *Text Conventions Used*

Purpose

This manual provides the details of how to use **ca**ncer **B**ench-to-**B**edside (caB2B) Web Application to search data (for example, Biospecimen data, Microarray data, etc.) available on the **ca**ncer **B**iomedical **I**nformatics **G**rid (caBIG®). The user can search data using keyword searches or detailed saved searches. The user can export and save the retrieved data for further experimentation work or analysis. The user can also submit queries for offline execution and view the results later when the query is complete.

Typical User

This guide is designed for clinical and translational research scientist. The term *translational research* means transforming scientific discoveries arising from laboratory, clinical, or population studies into clinical applications to reduce cancer incidence, morbidity, and mortality (definition from National Cancer Institute's Translational Research Working Group http://www.cancer.gov/trwg/TRWG-definition-and-TR-continuum). It begins at "the laboratory bench" with basic research. Scientists study a disease at a molecular or cellular level to come up with discoveries. These discoveries then progresses to the clinical level, or the patient's "bedside"

No special knowledge or skill is required to use the caB2B web application.

Topics Covered

If you are new to caB2B Web Application, read this brief overview. It explains what you will find in each chapter and appendix.

- "*Chapter 1: Introduction*" describes the scope and function of the Web Application.
- "*Chapter 2: Databases to Search*" describes the process of configuring service instances for a query
- "*Chapter 3: Keyword Search*" describes the process of searching data based on a keyword.
- "*Chapter 4: Saved Searches*" describes the process of searching data based on detailed saved searches.

- *"Chapter 5: Offline Query Execution*" describes the process of submitting query to run in background and viewing results sometime later.
- "*Chapter 6: Error Messages/Indicators and Problem Resolutions*" describes various error messages and troubleshooting options.
- "*Appendix A: Example for searching data*" describes an example query that can be executed using the caB2B Web Application.
- *"Appendix B: Define Limit: Operators and Values"* describes the various operators and their values that are available for defining limits.

Text Conventions Used

This section explains the conventions used in this guide. The various typefaces listed below represent interface components, keyboard shortcuts, toolbar buttons, dialog box options, and text that you type.

Convention	***Description***	***Example***
Bold	Highlights names of option buttons, check boxes, drop-down menus, menu commands, command buttons, or icons	Click **Search**.
URL	Indicates a Web address	http://domain.com
text in SMALL CAPS	Indicates a keyboard shortcut	Press ENTER.
text in SMALL CAPS + text in SMALL CAPS	Indicates keys that are pressed simultaneously	Press SHIFT + CTRL
Italics	Highlights references to other documents, sections, figures, and tables	See *Figure 4.5*.
Italic boldface monospace type	Represents text that you type	In the **New Subset** text box, enter ***Proprietary Proteins***.
Note:	Highlights information of particular importance	**Note:** This concept is used throughout this document.
{ }	Surrounds replaceable items	Replace {last name, first name} with the Principal Investigator's name.
	Indicates information of particular interest	 To select all the institutes check **Select All.**
WARNING!	Indicates that you should be particularly aware of the information provided	**WARNING!** You cannot abort a query.

Chapter 1 Introduction

This chapter explains the scope and function of the cancer Bench-to-Bedside (caB2B) Web Application. It helps you understand how to use caB2B Web Application to fetch data for research work. It contains the following topics:

- *Conducting Research using caB2B Web Application*
- *Getting started with caB2B*
- *Starting caB2B Web Application*
- *Home Page*
- *Types of User*
- *Understanding Queries and Limits*
- *Application Workflow*
- *How Web Application differs from the Client Application?*

Conducting Research using caB2B Web Application

The **N**ational **C**ancer **I**nstitute **ca**ncer **B**iomedical **I**nformatics **G**rid® (NCI caBIG®) project creates a common, extensible informatics platform that integrates diverse data types and supports interoperable analytic tools. caBIG® is developing separate applications that will facilitate individual steps involved in various biological experiments and analysis.

caGrid is the infrastructure for caBIG® that helps integrate these applications. It is used to perform investigations involving data integration and analytical services from diverse research communities.

caB2B Web Application (henceforth called as Web Application) leverages these tools in a user-friendly graphical user interface (GUI). It provides query templates that allow easy search and retrieval of data across the grid. Searches can be performed on selected locations using either form-based or keyword searches and data can be exported in CSV format. These data sources can be different applications storing similar kind of data. Web Application provides you following high-level functionalities:

- **Query caGrid data service to obtain data**

  You can easily search for microarray data (from caArray), imaging data (from NBIA-National Biomedical Imaging Archive), biospecimen data (from caTissue) and nanoparticle data (from caNanoLab) across the grid without having to understand how the data is stored, retrieved and transmitted over caGrid. You can use keyword-based search or a more specific saved search to retrieve the data.

- **Export data for further research use**

  You can export the results obtained from keyword or saved searches and use it whenever required. Application supports exporting results in comma-separated file (CSV) format.

- **Query data from multiple institutions**

  You can execute your query to get data from multiple institutions at a time.

Getting started with caB2B

caB2B provides a platform to bridge the gap between the laboratory research and the clinical level. It enables information to be shared along the continuum from the scientific bench to the clinical bedside and back. The tool helps in querying the data available on caGrid. For example, it is possible to get information about tissue samples collected from patients suffering from *Glioblastoma multiforme* at any cancer center available on caGrid.

The caB2B suite is composed of three components:

- Web Application
- Administrative Module
- Client Application

The technical staff will install the entire caB2B suite. After installation, the administrator uses the Administrative Module to configure Client Application and Web Application. Only after initial setup and the configurations, you can use the Web Application to query the data sources of your interest.

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- To install caB2B refer to *caB2B Installation Manual*.
- To configure Web Application, refer to *caB2B Administration Manual* and the *caB2B Client Application End User Manual*.
- To know more about the Client Application refer to the *caB2B Client Application End User Manual*.

Starting caB2B Web Application

To start the Web Application, open your web browser (Internet Explorer or Firefox) and enter the link of Web Application. If you want to use caB2B installed at your center, get the web address from the caB2B administrator at your center. Alternatively, to access the publically available application at the Washington University or National Cancer Institute, you can use get the web address from https://cabig.nci.nih.gov/tools/caB2B/.

The web browser will navigate to the home page of application, as shown below in *Figure 1.1. Home Page*.

Home Page

The home page shows the queries for one of the non-secure data source by default. Data available on caGrid can be categorized into two types:

1. Non-secure data: Publicly available data (for example, microarray data available in caArray)

2. Secure data: Data that is accessible to authenticated users (for example, Biospecimen data available in caTissue).

Following image shows the home page of Web Application.

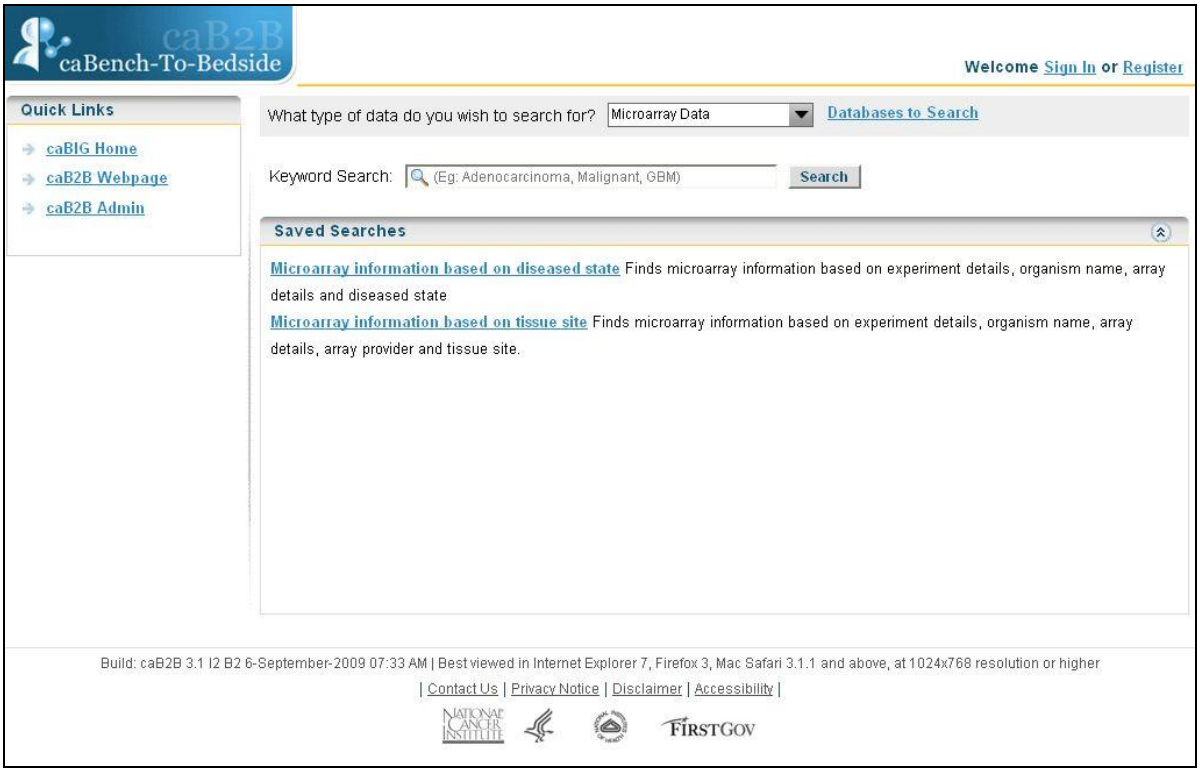


Figure 1.1. Home Page

Home page displays following information:

1. **Sign In** or **Register**

   To access secure data you need to login to the Web Application with your production caGrid credentials. To login to the application, click **Sign In** link at the top of the page (refer to ***Error! Reference source not found.***). If you do not have caGrid credentials then you can create one by clicking **Register** link.

2. **Quick links**

   Quick links refer to the caBIG® Home Page, caB2B Web Page and caB2B Administrative Module. You can navigate to these applications from the Web Application.

3. **What type of data do you wish to search for?**

   It displays all types of data that you can query using the Web Application. The queries in the saved searches panel are updated depending on the type of data. The administrator will define the types of data you can search for using the Administrative Module.

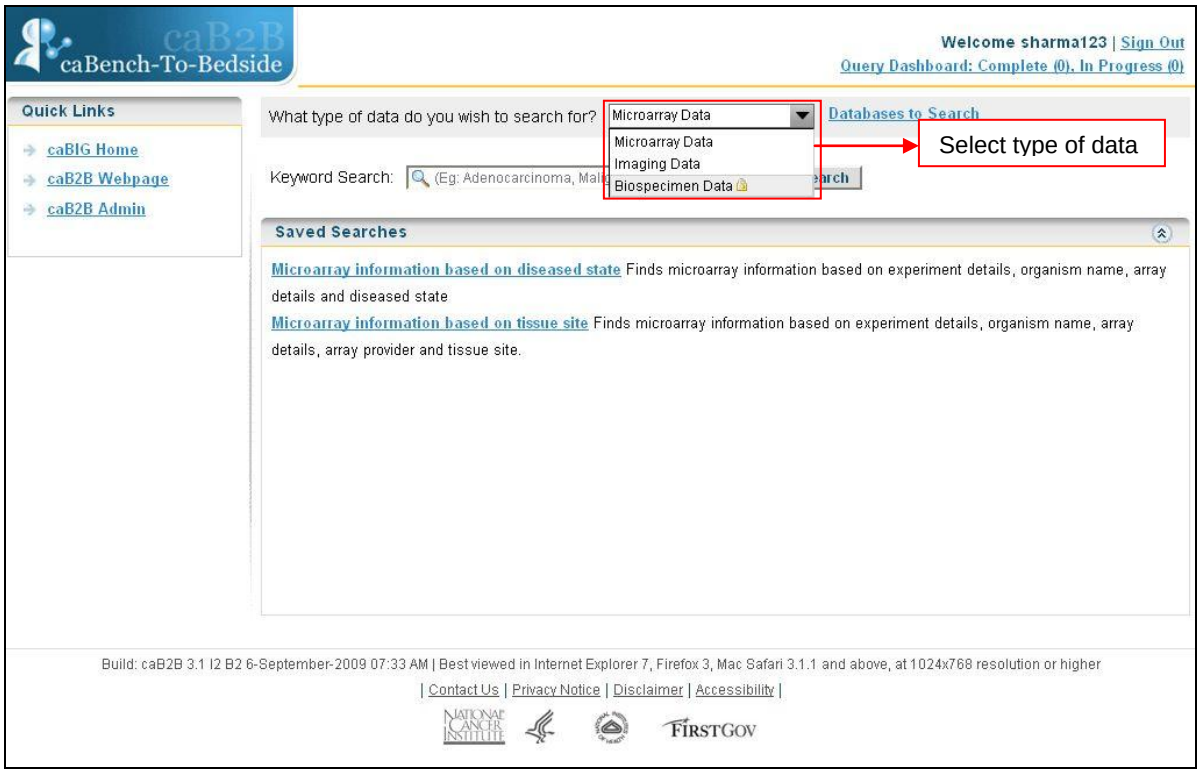


Figure 1.2. Home page showing types of data

4. **Databases to Search**

   For databases to search, refer to

   Databases to Search

5. **Keyword Search**

   You need to provide a word/s to get the results from a keyword search. The application would search selected databases for the given word. For more details of executing a keyword search, refer to *Keyword Search*. For example, you can search for a keyword *Melanoma,* for more details refer to *Example for searching data.*

6. **Saved Search**

   A saved search is a systematic way to find data where you will provide specific search criteria. It allows you to set conditions on available limits. For more details of executing a saved search, refer to *Saved Searches*. For example, you can search for Tissue specimen details with *Clinical Diagnosis* as *Melanoma,* for more details refer to *Example for searching data.*

7. **Query Dashboard**

   Signed in user can submit queries for offline execution. All such queries are executes in the background. You need not wait for the query execution to complete. You can submit queries for offline execution and later return to query dashboard to view results and query details. To know more about offline query execution, refer to *Offline Query Execution*.

Types of User

The application supports two user roles – Anonymous User and Grid User. You can search for data without actually signing in, although only non-secure data is searchable. All such users who are querying for data without signing in are Anonymous Users.

You can sign into the application using their production caGrid credentials to search secure data. All such users who sign in are Grid User. To sign into the application, follow the steps given below:

1. Click on the **Sign In** link, at the top right hand corner on the *Home* Page.
2. Enter **User Name** and **Password** (refer to *Login page*).
3. Click **Login.**
4. If you make an error while entering data, click **Reset**, to clear the fields.
5. To return to the home page click **Home** link at the top right corner

Figure 1.3. Login page

If you do not have a production caGrid account, then click on the **Register** link on either the home page or the login page. This will navigate you to the caGrid registration page. You can create a user account from there.

Understanding Queries and Limits

Queries and limits form the basis of the web application. Queries help you to fetch data from various applications. The limits set on the queries decide what result would be fetched from the application. To understand the queries you need to understand a category.

What is a Category?

A category is a collection of *searchable* attributes of an application/model. A user can use a category to search data. Every domain object in an

application/model is, trivially, a category. For example, *Participant* is a domain object from *caTissue Core* application.

Examples:

The *Participant* class consists of the following attributes:

- Identifier
- First Name
- Last Name
- Gender
- Race

The *Gene Annotation* class consists of the following attributes:

- Entrez Gene ID
- Gene Symbol
- Gene Name
- GenBank Accession Number
- Taxonomy ID
- Chromosome

What is a Limit?

A limit is a condition (or criterion or predicate) on a category. It is the smallest unit of a query. Data is fetched depending on what limit is set on a category.

For example, for the *Participant* category above you can set a limit to fetch all *female participants.* Thus, we are defining a limit on *Participant* category's *Gender* attribute. Each such individual condition is called Limit.

What is a Query?

A collection of limits is a query. Example of a query is *find all female participants who have DNA specimens collected from their breast*. This query has multiple limits:

Participants with *Gender* as *Female*

Specimens with *Type* as *DNA*

Tissue with *Site* as *Breast*

A combination of all these limits forms a query. In the Web Application, you would be executing queries that will have a single or multiple limits.

	caB2B administrator creates the saved-searches and the keyword queries using Client Application.

Application Workflow

The general workflow within the application follows the steps outlined below:

1. Access the caB2B web application home page.
2. Login if you want to query a secured data service.
3. Select type of data from **What type of data do you wish to search for?**
4. Select the institutions to be queried
5. Execute a keyword search or saved search
    a. Refer to *Chapter 3: Keyword Search* for details of keyword query
    b. Refer to *Chapter 4: Saved Searches* for details of saved searches
6. Navigate to the results page.
7. Wait for the query to complete to download the results or submit it for offline execution.
8. Navigate to the Query Dashboard to view the status of the queries submitted for offline execution.
9. Export the results for the queries.

How Web Application differs from the Client Application?

Web Application is an easy to use tool that is accessible to users over the web and does not require any download and installation. caB2B Web Application allows users to perform predefined queries to retrieve microarray data (caArray), image data (NBIA), biospecimen data (caTissue Core) and nanoparticle data (caNanoLab) across caGrid without having to understand how the data is structured and stored, how it is retrieved and transmitted over grid. Users do not need to rely on the understanding of domain models for the caBIG® applications. Administrator defines queries based on common use cases and those are available for users to execute. A user can perform either a keyword search or a saved search (like canned query). Users can export the results retrieved for future reference and analysis

Client Application, on the other hand, is a java-based desktop application that needs to be downloaded. Advanced users with knowledge of caBIG® applications and their domain models can create and save custom queries. These queries can be accessed through either the Client or the Web application. User can create the queries and execute them for any caGrid data services. You can also save the results returned in the form of a 'virtual experiment'. Various graphical components like scatter plots, bar charts etc are available to visualize this data.

Chapter 2 Databases to Search

This chapter describes how to configure the hosting institutions from which you want to fetch data. It contains the following topics:

- *Introduction to Databases to Search*
- *Steps to Configure* Hosting Institutions

Introduction to Databases to Search

"Databases to search" lists all the hosting institutions that stores the type of data you selected. For example, if you select Microarray data, then you will see all hosting institutions that stores microarray data. The data is available for query in the form of active caGrid services that return data based on the query.

You can select multiple hosting institutions to query. For example, if you select the type of data as Microarray Data and select the *Washington University School of Medicine* and the *National Cancer Institute Center for Bioinformatics* hosting institutions, caB2B will fetch data from both these institutions.

By default, the application uses the administrator-defined services to fetch data. However, you can choose hosting institution that you want to query. If you are signed in user, your preferences are saved and the same will be used for future queries. If you are an anonymous user, your selections will not be saved. Your selections will be lost when you close the application.

Steps to Configure Hosting Institutions

1. Select a type of data (e.g. Microarray data) from the "**What type of data do you wish to search for?**" drop down.
2. Click **Databases to Search.**

Figure 2.1. Databases to search link on home page

3. Application lists all the hosting institutions that store the selected type of data.

If you have selected hosting institutions before, you will see those institutions as selected. Otherwise, you will see administrator-selected hosting institutions as selected.

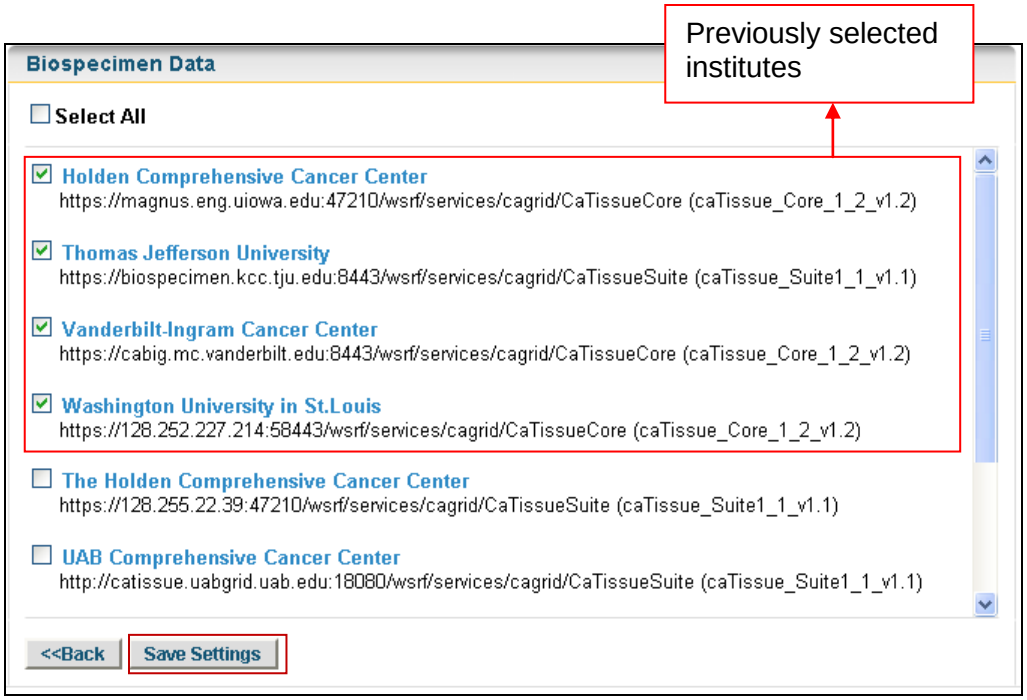


Figure 2.2. Hosting institutions for biospecimen data

F.Y.I.	Hosting Institution details shows the application model name and version to identify the service available at a particular institute.

4. Select the check boxes for the hosting institutions from where you wish to fetch the data and click **Save Settings** to save the hosting institutions

F.Y.I.	To select or deselect all the institutes click **Select All** check box.

5. If you do not want to change the settings then click **Back** to return back to the Home page

WARNING!	If you have not signed in then, hosting institutions selections are lost once you close the application. When you access the application again, the settings might have changed. If you sign into the application, then the hosting institution settings are persisted. When you signs in again, you will see your previous selections.

Chapter 3 Keyword Search

This chapter describes how to fetch data from caGrid data services using a keyword-based search. It contains following topics:

- *Introduction* to Keyword Search
- *Steps to* Perform Keyword Search
- *View Results*
- *Export Results*

Introduction to Keyword Search

Keyword search is the simplest type of search to get data. If you are new to caGrid-caB2B and looking for what kind of data is present on caGrid. Then you should be using keyword search. It allows you to get information like

- Microarray experiment details
- Biospecimen details along with the participant information
- Study details for an image
- Nanoparticle sample details

You just need to enter disease name, assay type, tissue site, specimen type, etc to get this information.

Administrator of caB2B identifies and creates most widely used queries for each type of data. When you perform keyword search, application executes these predefined queries using the keyword. To get the data, application queries selected institutions. Refer to

Databases to Search for more details.

For example, if you want to search for biospecimen data available for *Melanoma,* then enter a keyword *Melanoma.* This search will return biospecimen collected along with the participant information.

Steps to Perform Keyword Search

1. Select the type of data from the dropdown **What type of data do you wish to search for?,** like **Biospecimen Data**. (refer to *Home Page*)
2. Select the institutions you wish to query using **Databases to Search** (refer to
3. *Databases to* Search)
4. Type the search string in the text box next to **Keyword Search**, for example `Melanoma`.
5. Click **Search.**

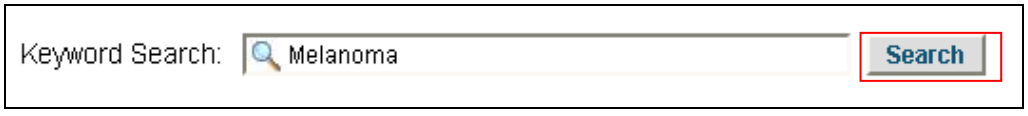


Figure 3.1. Keyword Search

Application navigates to the result view.

	If you specify a phrase while searching, results would contain the exact phrase. For example, if you query for *Spindle Cell Melanoma*, then the results would match the entire phrase and not a word. It will not contain results for *Melanoma* or *Cell*.

View Results

As explained above, for keyword search, application executes a set of predefined queries on the institutions you had selected. On the result page, you will see following information:

Multiple Queries

As explain above, keyword search uses administrator-defined queries to retrieved data. **Results for** dropdown shows the list of all such queries. On changing the query, you will see data fetched for that query.

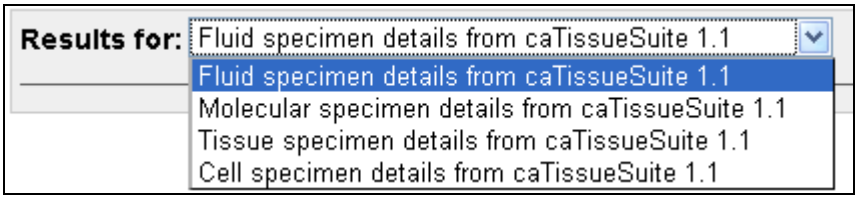


Figure 3.2. Dropdown showing different queries with the result count

Result Table

Application displays results of your keyword query in a tabular format. For each query, you would see a single table with a maximum of hundred records on user interface. In addition to the data, application also displays short name of the hosting institution from which it is retrieved. Until the point application is getting data for your query, you will see a screen below

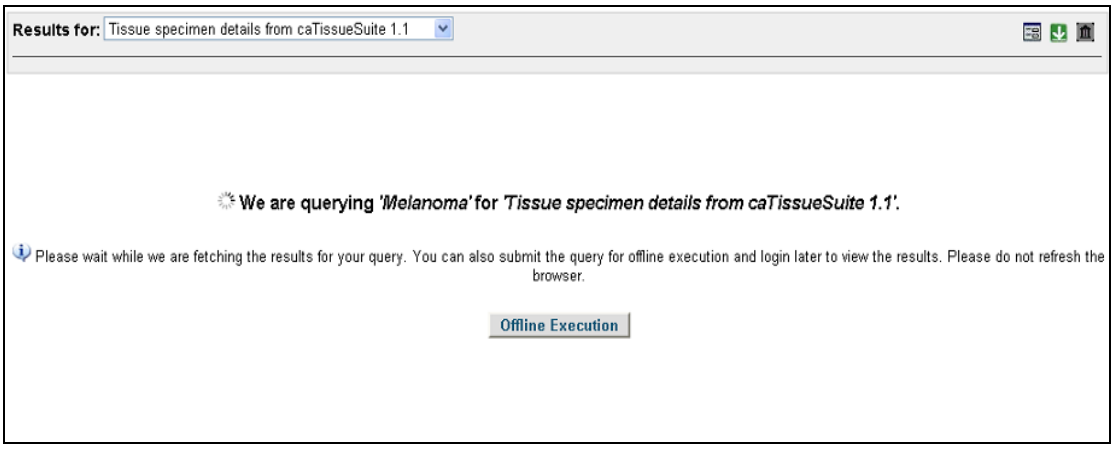
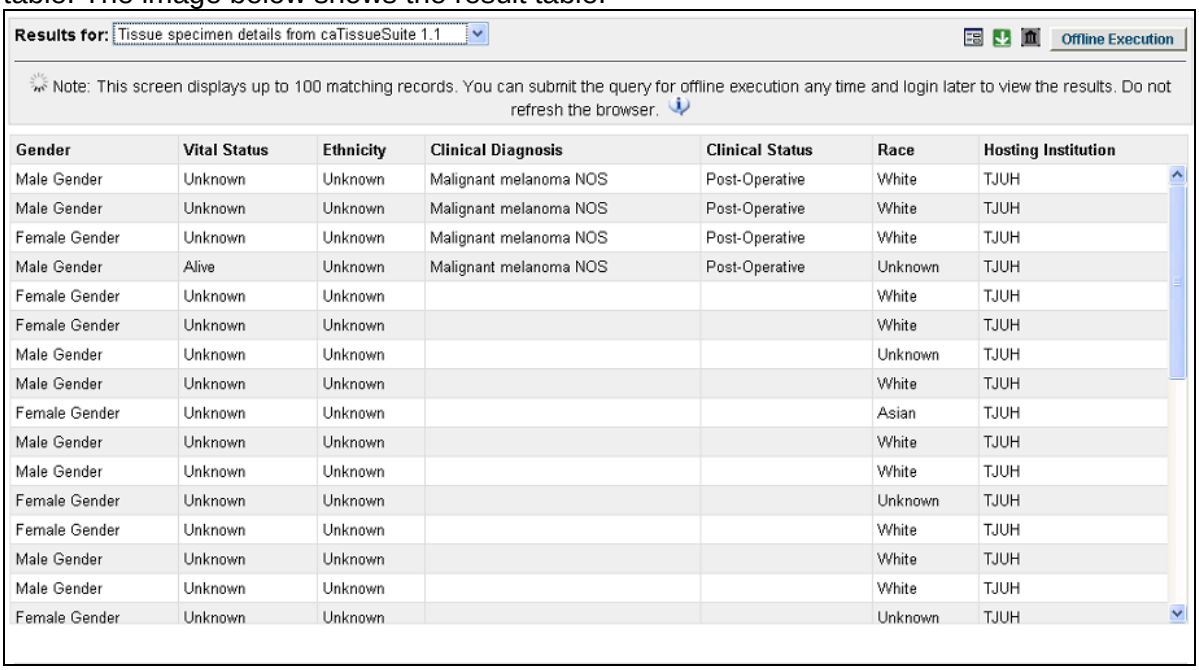


Figure 3.3. Wait screen before results appear

As soon as the application retrieves some results, it will start showing the result table. The image below shows the result table.

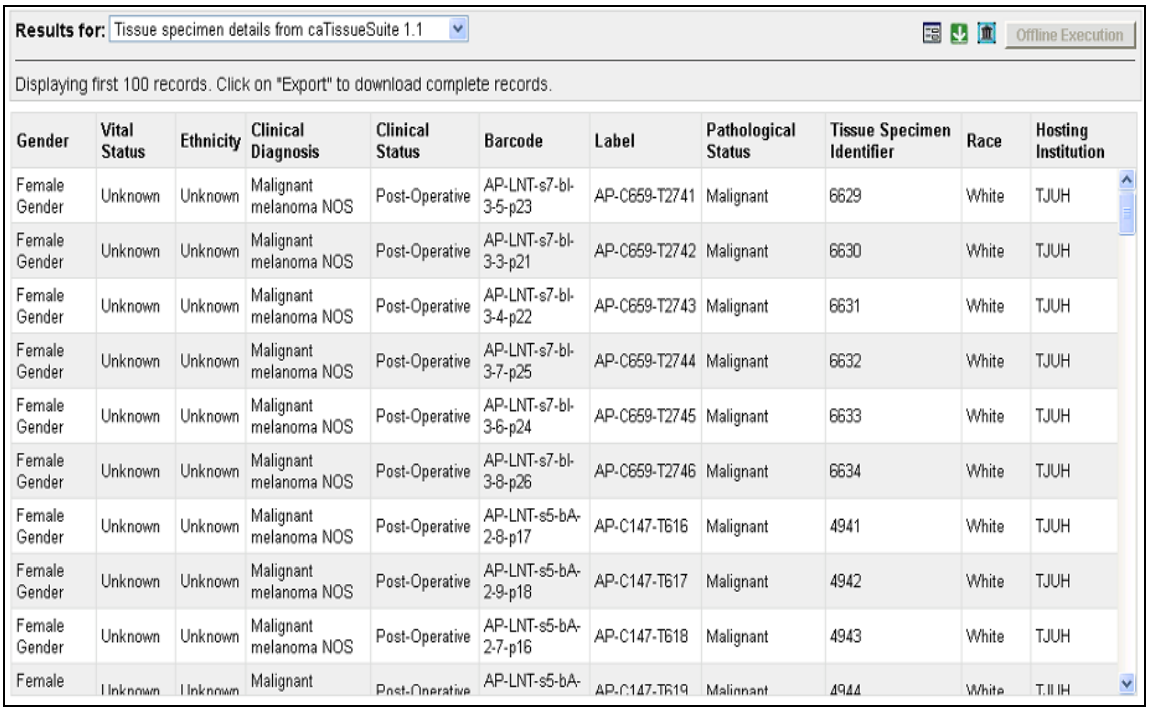


Gender	Vital Status	Ethnicity	Clinical Diagnosis	Clinical Status	Race	Hosting Institution
Male Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	White	TJUH
Male Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	White	TJUH
Male Gender	Alive	Unknown	Malignant melanoma NOS	Post-Operative	Unknown	TJUH
Female Gender	Unknown	Unknown			White	TJUH
Female Gender	Unknown	Unknown			White	TJUH
Male Gender	Unknown	Unknown			Unknown	TJUH
Male Gender	Unknown	Unknown			White	TJUH
Female Gender	Unknown	Unknown			Asian	TJUH
Male Gender	Unknown	Unknown			White	TJUH
Male Gender	Unknown	Unknown			White	TJUH
Female Gender	Unknown	Unknown			Unknown	TJUH
Female Gender	Unknown	Unknown			White	TJUH
Male Gender	Unknown	Unknown			White	TJUH
Male Gender	Unknown	Unknown			White	TJUH
Female Gender	Unknown	Unknown			Unknown	TJUH

Figure 3.4. Result table with a few results

Application updates the result table as and when more data is returned. Figure below shows the result table when the query is complete.

F.Y.I.	**Offline Execution** option is available while the query execution is in progress.



Results for: Tissue specimen details from caTissueSuite 1.1 — Offline Execution

Displaying first 100 records. Click on "Export" to download complete records.

Gender	Vital Status	Ethnicity	Clinical Diagnosis	Clinical Status	Barcode	Label	Pathological Status	Tissue Specimen Identifier	Race	Hosting Institution
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-5-p23	AP-C659-T2741	Malignant	6629	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-3-p21	AP-C659-T2742	Malignant	6630	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-4-p22	AP-C659-T2743	Malignant	6631	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-7-p25	AP-C659-T2744	Malignant	6632	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-6-p24	AP-C659-T2745	Malignant	6633	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-8-p26	AP-C659-T2746	Malignant	6634	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s5-bA-2-8-p17	AP-C147-T616	Malignant	4941	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s5-bA-2-9-p18	AP-C147-T617	Malignant	4942	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s5-bA-2-7-p16	AP-C147-T618	Malignant	4943	White	TJUH
Female	Unknown	Unknown	Malignant	Post-Operative	AP-LNT-s5-bA-	AP-C147-T619	Malignant	4944	White	TJUH

Figure 3.5. Results for Keyword Search

F.Y.I.	A signed in user can submit the query for offline execution and later sign in to view the results of the query. For more details of offline execution, refer to *Offline Query Execution.*

Options on Result Page

Figure 3.5. Results for Keyword Search , shows the various options available on the result page at the top right hand corner. These options are:

1. **Query Parameters:** You can mouse over to see the limits defined for the query on the result page.

Parameter	Condition	Value
Keyword	Search for	Melanoma

Figure 3.6. Query Parameter

2. **Failed Hosting Institutions:** You can click to see the institutions that failed to return results. If no institutes failed, then you would see . To know more, refer to *Failed Hosting Institutions*.
3. **Export:** You can click to download the results when the query execution is complete. Refer to section *Export* Results below for more information on export.
4. **Offline Execution:** This option is only available to the signed in users. You can submit the query for offline execution and navigate away. When you sign in

later, you can go to query dashboard to export the results. Refer to *Offline Query Execution* for more information on offline execution.

Export Results

Once the query is complete, you can export the results of your query in csv (comma-separated file) format. When you click  , application will prompt you to download a zip file. For a keyword query, there are multiple files present in the downloaded zip file. The result for each administrator-defined query is stored in a separate file. The exported csv file contains the following information:

1. **Query Title:** Title of the query, like *Tissue specimen details*
2. **Query Description:** Description of the query, like *Finds all tissue specimens based on participant information and clinic-pathological information from a particular tissue site*
3. **Execution Date:** Time at which query started its execution
4. **Executed By:** Your caGrid user name
5. **Conditions:** This section describes the conditions used to execute the query. It includes conditions you have added along with conditions specified by administrator
6. **Results:** This section displays the result of the query. You can view all the records in the exported results. In addition to the data, the following information is added to the exported results:
    a. Name of the application from which the data is fetched
    b. Full name of the hosting institution, point of contact and email address

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Query Title:** Tissue specimen details												
2	**Query Description:** Finds all tissue specimens based on participant information and clinicopathological information from a particular tissue site												
3	**Execution Date:** Sat Aug 29 19:07:51 IST 2009												
4	**Executed By:** pooja												
5													
6	**Conditions**												
7	**Parameter**	**Condition**	**Value**										
8	Tissue Specimen Ava	Equals	TRUE										
9	Clinical Status	In	New Diagnosis										
10	Pathological Status	In	Malignant										
11	Tissue Specimen Typ	In	Fixed Tissue										
12	Gender	In	Female Gender										
13													
14	**Clinical Status**	**Clinical Di**	**Vital Statu**	**Gender**	**Barcode**	**Tissue Spe**	**Label**	**Tissue Spe**	**Pathologi**	**Race**	**Model Name**	**Hosting Ce**	**Point of C**	**Co**
15	New Diagnosis	Not Specified		Female Gender	14053	286296	14053		Malignant		caTissue_Cor	Washingt(	Rekha Me	he
16	New Diagnosis	Not Specified		Female Gender	25237	209962	25237		Malignant		caTissue_Cor	Washingt(	Rekha Me	he
17	New Diagnosis	Not Specified		Female Gender	34516	210975	34516		Malignant		caTissue_Cor	Washingt(	Rekha Me	he
18	New Diagnosis	Not Specified		Female Gender	14146	215784	14146		Malignant		caTissue_Cor	Washingt(	Rekha Me	he
19	New Diagnosis	Not Specified		Female Gender	17466	283374	17466		Malignant		caTissue_Cor	Washingt(	Rekha Me	he
20	New Diagnosis	Not Specit	Alive	Female Gender		748191	100717A	Fixed Tiss	Malignant	White	caTissue_Sui	No Hosting	Center Nam	
21	New Diagnosis	Not Specit	Alive	Female Gender		748192	100717B	Fixed Tiss	Malignant	White	caTissue_Sui	No Hosting	Center Nam	
22	New Diagnosis	Not Specit	Alive	Female Gender		748135	100656A	Fixed Tiss	Malignant	White	caTissue_Sui	No Hosting	Center Nam	
23	New Diagnosis	Not Specit	Alive	Female Gender		748136	100656B	Fixed Tiss	Malignant	White	caTissue_Sui	No Hosting	Center Nam	
24	New Diagnosis	Not Specit	Alive	Female Gender		748137	100656C	Fixed Tiss	Malignant	White	caTissue_Sui	No Hosting	Center Nam	
25	New Diagnosis	Not Specit	Alive	Female Gender		748138	100657A	Fixed Tiss	Malignant	White	caTissue_Sui	No Hosting	Center Nam	
26	New Diagnosis	Not Specit	Alive	Female Gender		748139	100657B	Fixed Tiss	Malignant	White	caTissue_Sui	No Hosting	Center Nam	
27	New Diagnosis	Not Specit	Alive	Female Gender		748140	100657C	Fixed Tiss	Malignant	White	caTissue_Sui	No Hosting	Center Nam	
28	New Diagnosis	Not Specit	Alive	Female Gender		748032	100544A	Fixed Tiss	Malignant	Not Repor	caTissue_Sui	No Hosting	Center Nam	

16_1251560636266

Figure 3.7. Exported results for Tissue specimen details

Chapter 4 Saved Searches

This chapter describes how to fetch data from institutions using a saved search. It contains following topics:

- *Introduction to Saved Search*
- *Steps to Define Limits*
- *View search Results*
- *Export Results*

Introduction to Saved Search

A saved search allows you to set conditions on limits and execute the query. Unlike keyword search, saved search is more systematic as you define conditions on certain set of attributes.

As explained previously, for keyword search, application executes administrator-defined queries to retrieved data. If you want a very specific search, you can choose one of the saved searches. It shows you specific attributes-operators-values. You can use these to define limits to build a complex query. As it is a directed search, it is helpful and very effective. Also due to lesser number of queries, saved search is faster as compared to the keyword search.

Each saved search consists of a set of attributes on which you can define a limit. For example, if you want to find the *malignant Melanoma tissue specimens* then, you would use search *Tissue specimen details* and specify *Clinical Diagnosis* attribute *equal to Melanoma* and *Pathological Status* attribute *in Malignant*.

Administrator of the Web Application creates the saved searches. If you want certain saved search in the Web Application, contact your caB2B administrator.

Steps to Define Limits

Define limits page appears when you select a saved search from the home page. The define limit page displays the limits on which you can define a condition. You can define a condition by choosing an operator and value. The value can be a word or a phrase. Some attributes contain a fixed set of values; you can choose one or more values from this set to define a condition.

Follow the steps given below to define limit and execute a saved search:

1. Select the type of data from the dropdown **What type of data do you wish to search for?,** like Biospecimen Data. (Refer to *Home Page*).
2. Click a query name from the **Saved Searches** panel, example, **Tissue specimen details**.

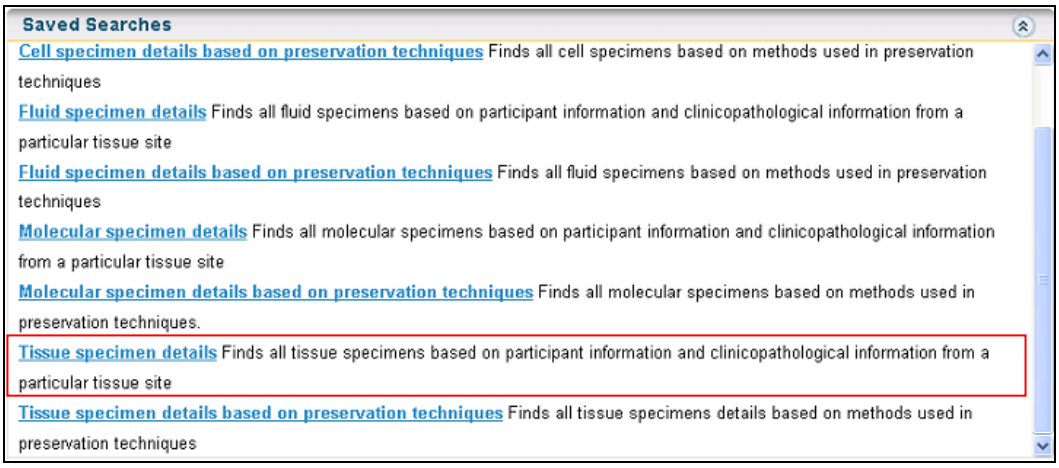


Figure 4.1. Saved searches for Biospecimen data

Define Limits page appears.

3. Add a limit to the available **Variables**, example *Clinical Diagnosis* Contains `Melanoma` and *Pathological Status* In *Malignant*.

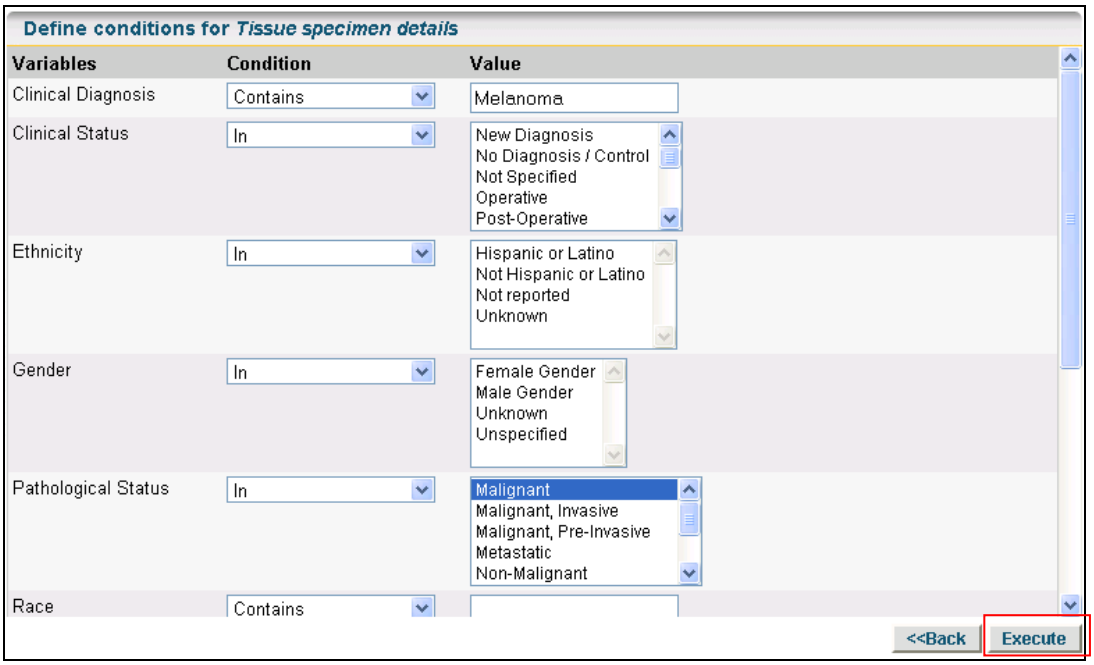


Figure 4.2. Define Limit

F.Y.I.	To know more about defining limits, and how to specify the limits and values, refer to *Appendix B: Define Limit: Operators and Values.*

4. Click **Execute**.

Application will navigate to the result view

View search Results

The saved search results page is similar to the keyword search page. As you are executing a single query, the **Results For** displays the title of the query instead of the dropdown. You can see the number of results fetched next to the query title. On the result page, you will see following information:

Result Table

Application displays results of your saved search in a tabular format. For the search, you would see a single table with a maximum of hundred records on the user interface. In addition to the data, application also displays short name of the hosting institution from which it is retrieved. Until the point application is getting data for your query, you will see a screen as shown below

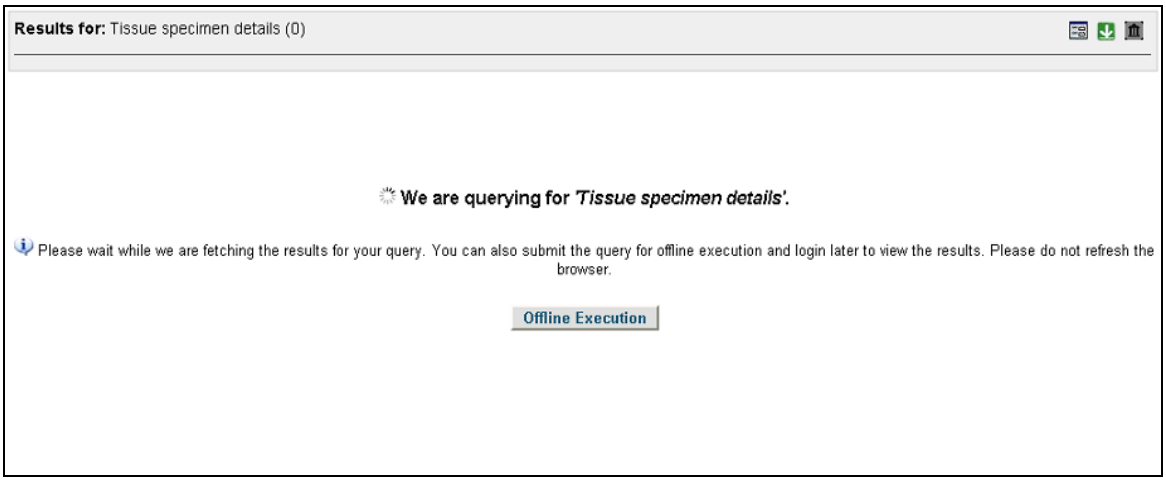
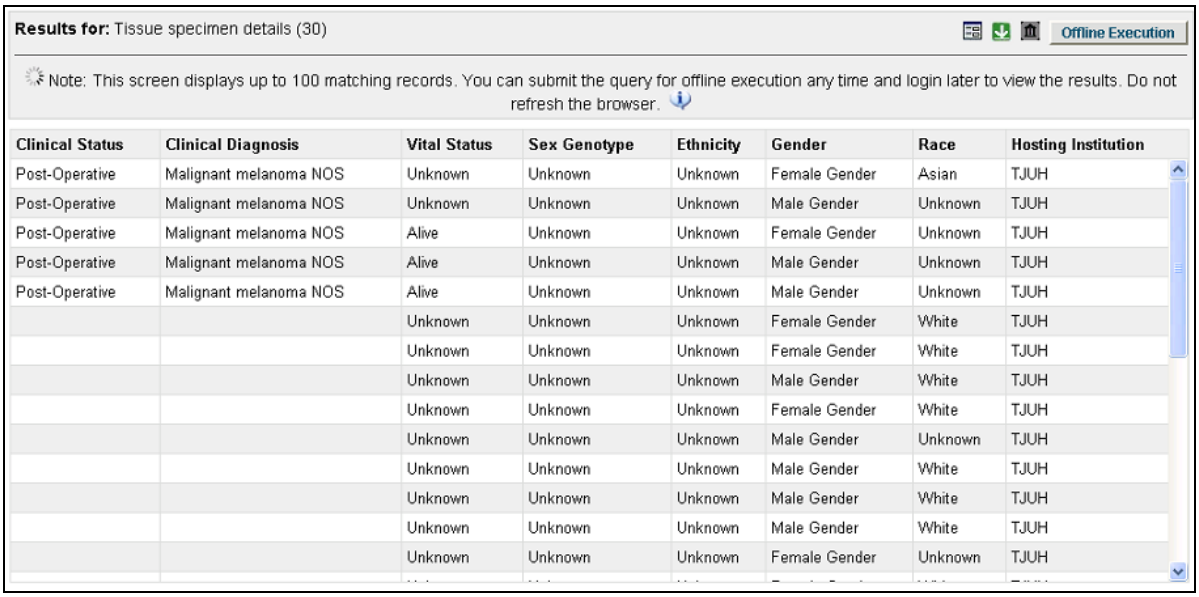


Figure 4.3.Wait screen before results appear

As soon as the application retrieves some results, it will start showing the result table. The image below shows the result table.



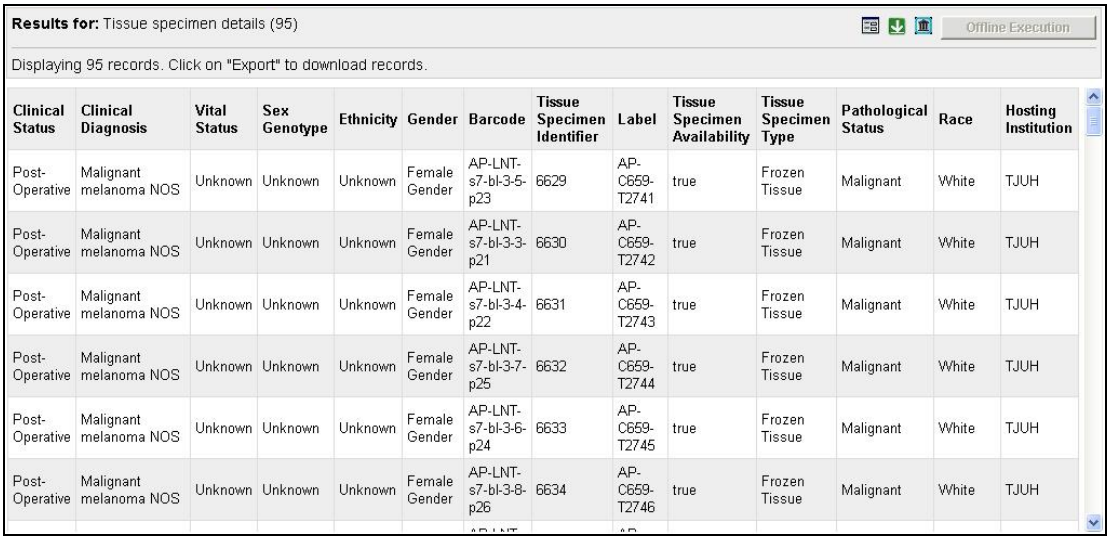
Results for: Tissue specimen details (30) Offline Execution

Note: This screen displays up to 100 matching records. You can submit the query for offline execution any time and login later to view the results. Do not refresh the browser.

Clinical Status	Clinical Diagnosis	Vital Status	Sex Genotype	Ethnicity	Gender	Race	Hosting Institution
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	Asian	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Male Gender	Unknown	TJUH
Post-Operative	Malignant melanoma NOS	Alive	Unknown	Unknown	Female Gender	Unknown	TJUH
Post-Operative	Malignant melanoma NOS	Alive	Unknown	Unknown	Male Gender	Unknown	TJUH
Post-Operative	Malignant melanoma NOS	Alive	Unknown	Unknown	Male Gender	Unknown	TJUH
		Unknown	Unknown	Unknown	Female Gender	White	TJUH
		Unknown	Unknown	Unknown	Female Gender	White	TJUH
		Unknown	Unknown	Unknown	Male Gender	White	TJUH
		Unknown	Unknown	Unknown	Female Gender	White	TJUH
		Unknown	Unknown	Unknown	Male Gender	Unknown	TJUH
		Unknown	Unknown	Unknown	Male Gender	White	TJUH
		Unknown	Unknown	Unknown	Male Gender	White	TJUH
		Unknown	Unknown	Unknown	Male Gender	White	TJUH
		Unknown	Unknown	Unknown	Female Gender	Unknown	TJUH

Figure 4.4. Result table with a few results

Application updates the result table as and when more data is returned. Figure below shows the result table when the query is complete.

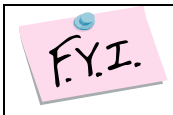


Results for: Tissue specimen details (95) Offline Execution

Displaying 95 records. Click on "Export" to download records.

Clinical Status	Clinical Diagnosis	Vital Status	Sex Genotype	Ethnicity	Gender	Barcode	Tissue Specimen Identifier	Label	Tissue Specimen Availability	Tissue Specimen Type	Pathological Status	Race	Hosting Institution
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-5-p23	6629	AP-C659-T2741	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-3-p21	6630	AP-C659-T2742	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-4-p22	6631	AP-C659-T2743	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-7-p25	6632	AP-C659-T2744	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-6-p24	6633	AP-C659-T2745	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-8-p26	6634	AP-C659-T2746	true	Frozen Tissue	Malignant	White	TJUH

Figure 4.5. Result for Saved Search



A signed in user can submit the query for offline execution and later sign in to view the results of the query. For more details of offline execution, refer to Chapter *Offline Query Execution.*

Options on Result Page

Figure 4.5. Result for Saved Search, shows the various options available on the result page at the top right hand corner. These options are:

1. Query Parameters: You can click  to see the limits defined for the query on the result page.

Parameter	Condition	Value
Tissue Specimen Availability	Equals	true
Clinical Diagnosis	Contains	Melanoma
Pathological Status	In	Malignant

Figure 4.6. Query Parameters

2. Failed Hosting Institutions: You can click  to see the institutions that failed to return results. If no institutes failed, then you would see  .
3. Export: You can click  to export and download the results when the query execution is complete. Refer to section *Export* Results in keyword search for more information on export.
4. Offline Execution: This option is only available to the signed in users. You can submit the query for offline execution and navigate away. When you sign in later, you can go to query dashboard to export the results. Refer to *Offline Query Execution* for more information on offline execution.

Export Results

The Export option for a saved search is same as that of a keyword search. The only difference being that the downloaded zip file contains a single file for a particular query. For more details of various options available, refer to *Export Results* in keyword search section.

Chapter 5 Offline Query Execution

This chapter describes how you can submit a query to execute in background and view the result later. In contains the following topics:

- *Introduction to Offline Query Execution*
- *Steps to Execute Offline Queries*
- *Query Dashboard*

Introduction to Offline Query Execution

Offline query execution means that you can submit a query to run in background and view the results later. You can navigate away from the application when you submit the query for offline execution. You can submit queries for offline execution only if you have signed in with your caGrid credentials.

Offline query execution is particularly useful in cases where your query fetches large amount of data. It is not possible for you to wait until the application fetches all the results. In such scenarios, you can submit queries for offline execution.

Once you submit a query for offline execution, it is available on the query dashboard for future reference. You can sign in any time and check the status of your queries. When the query execution completes you can download the results and save it.

Query dashboard displays all the queries that you had submitted for offline execution. In addition, it also shows information such as query status, number of results fetched, hosting institution status etc.

Steps to Execute Offline Queries

You can submit keyword as well as saved search for offline execution. To submit a query for offline execution, follow the steps below:

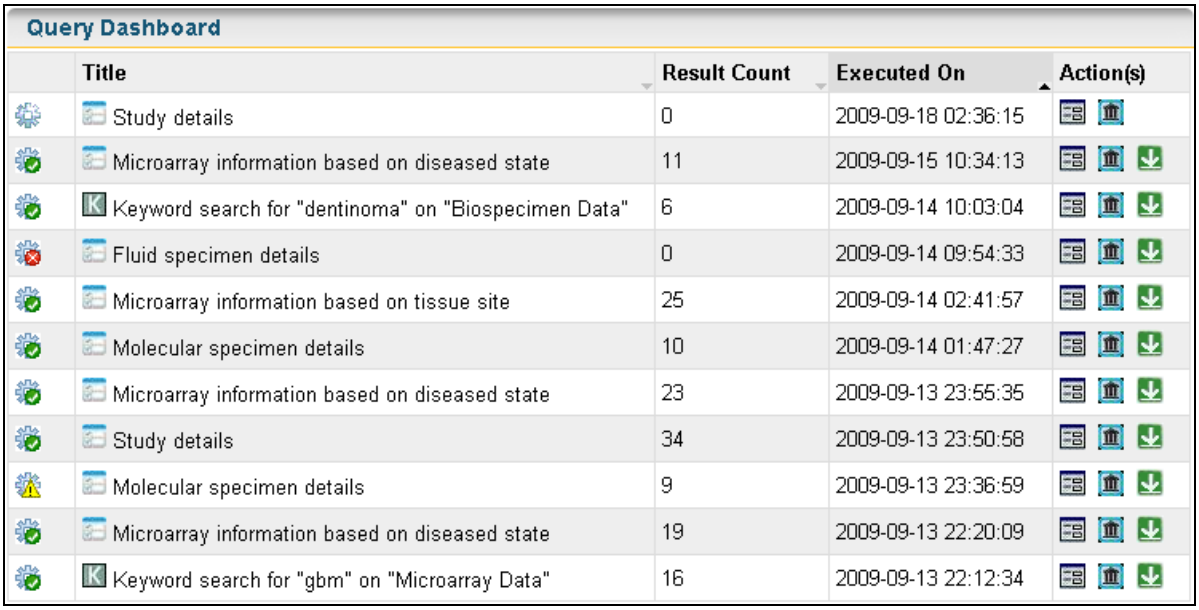
1. Sign in to the application using your caGrid credentials.
2. Select a data type from the **What type of data do you wish to search for?**
3. To execute a query,
    a. For keyword search,
        i. Type in a keyword
        ii. Click **Search** (refer to *Figure 3.1. Keyword Search*)**.**
    b. For saved search, from the **Saved Search** panel select a query to execute (refer to *Figure 4.1. Saved searches for Biospecimen data*).
        i. Specify the limits on the **Define Limits** page (refer to *Figure 4.2. Define Limit*). For more details, refer to *Steps to Define Limits.*
        ii. Click **Execute.**

4. On the results page click **Offline Execution** (refer to *Figure 3.4* or *Figure 4.4*)**.**

Once you submit a query for offline execution, the application navigates to the query dashboard.

Query Dashboard

Query dashboard shows all the queries that you had submitted for offline execution. It is available only to the signed in users. The following figure shows your dashboard:



Query Dashboard

	Title	Result Count	Executed On	Action(s)
	Study details	0	2009-09-18 02:36:15	
	Microarray information based on diseased state	11	2009-09-15 10:34:13	
	Keyword search for "dentinoma" on "Biospecimen Data"	6	2009-09-14 10:03:04	
	Fluid specimen details	0	2009-09-14 09:54:33	
	Microarray information based on tissue site	25	2009-09-14 02:41:57	
	Molecular specimen details	10	2009-09-14 01:47:27	
	Microarray information based on diseased state	23	2009-09-13 23:55:35	
	Study details	34	2009-09-13 23:50:58	
	Molecular specimen details	9	2009-09-13 23:36:59	
	Microarray information based on diseased state	19	2009-09-13 22:20:09	
	Keyword search for "gbm" on "Microarray Data"	16	2009-09-13 22:12:34	

Figure 5.1. Query Dashboard

The dashboard provides the following information:

1. **Query Status:** Status of the query. Query status can be either:
   a. In progress : Query execution is in progress.
   b. Complete : Query execution is complete.
   c. Failed : Query execution failed.
   d. Some data could not be fetched : A part of the query failed.
   e. Suspended : Query could not complete as the application stopped abruptly.

F.Y.I.	If the caB2B application shuts down abruptly, the query shows the suspended status. If a query is suspended then, the export option is not available even though the result count shows that the results were fetched.

2. **Query Type:** Type of the query. There are two types of query:
    a. Keyword query:
    b. Saved search:
3. **Query Title:** Title of the query, like *Tissue specimen details*
4. **Result Count:** Count of results fetched by the query
5. **Execution On:** Time at which query started its execution
6. **Query Parameters**: The condition set while executing the query. Figure below shows the query parameters:

Parameter	Condition	Value
Tissue Specimen Availability	Equals	true
Clinical Diagnosis	Contains	Melanoma
Clinical Status	In	New Diagnosis
Pathological Status	In	Malignant
Tissue Specimen Type	In	Frozen Tissue
Gender	In	Female Gender

Figure 5.2. Query Parameters

7. **Hosting Institution Information**: The hosting institutions you selected for the query. The figure below shows the hosting institution information:

Hosting Institution Name	Result Count
HCCC	3
MDACC	3
JHU SKCCC	0
MOFFITT	3
VICC	0

Figure 5.3. Hosting Institute Information

The tool tip displays the following information:

a. **Institution Status**: The status reflects whether the institution could be queried or not. The status can be:
    i. Complete:
    ii. Failed:

iii. Some data could not be fetched: 

b. **Hosting Institution Name**: Short name for the hosting institution

c. **Result Count**: Number of results retrieved from each institution.

8. **Export Results**  : It allows you to download the results once the query execution is complete.

You can sort the queries on the dashboard based on any of the columns available. The dashboard displays all the queries that you had executed in background in the last 20 days. You should therefore, download all the results and store them locally.

Chapter 6 Error Messages/Indicators and Problem Resolutions

This chapter provides help in dealing with certain common error messages and their solution. It covers the following erroneous situations:

- *Accessing secure data*
- *Invalid login credentials*
- *Failed Hosting Institutions*

Accessing secure data

To access secure data you need to sign in to the application using your caGrid credentials. For example, Biospecimen data is secure so if you try to select **Biospecimen data,** application gives a message asking you to sign in.

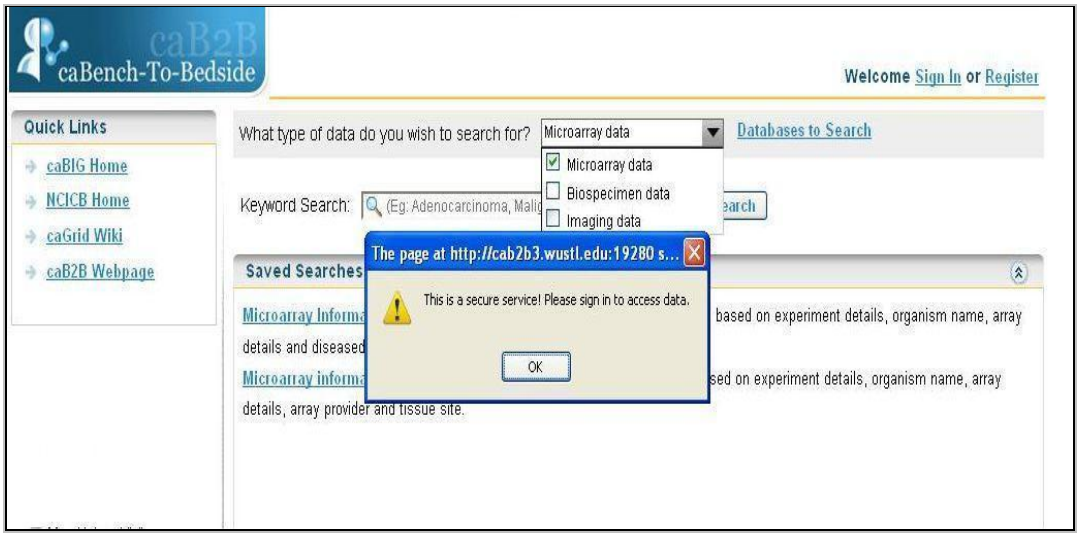


Figure 6.1. Error message on accessing secure data

Invalid login credentials

Web Application gives error if invalid login credentials are used.

Figure 6.2. Invalid grid credentials error message

Failed Hosting Institutions

caB2B web application allows to select the hosting institution from where you wish to search data (refer to *Databases to* Search). If any hosting institution fails to return results then, you would see on the result page. You can click it to view the failed hosting institution.

Figure 6.3. Failed Hosting Institution

You can go to the **Databases to Search** page and remove the failed hosting institution.

Appendix A Example for searching data

This appendix provides example of searching data:

- *Keyword Search*
- *Saved Searches*

Keyword Search

To find biospecimen data for *Melanoma* you can use keyword search. Follow the steps given below:

1. Select **Biospecimen data** from **What type of data do you wish to search for?** dropdown

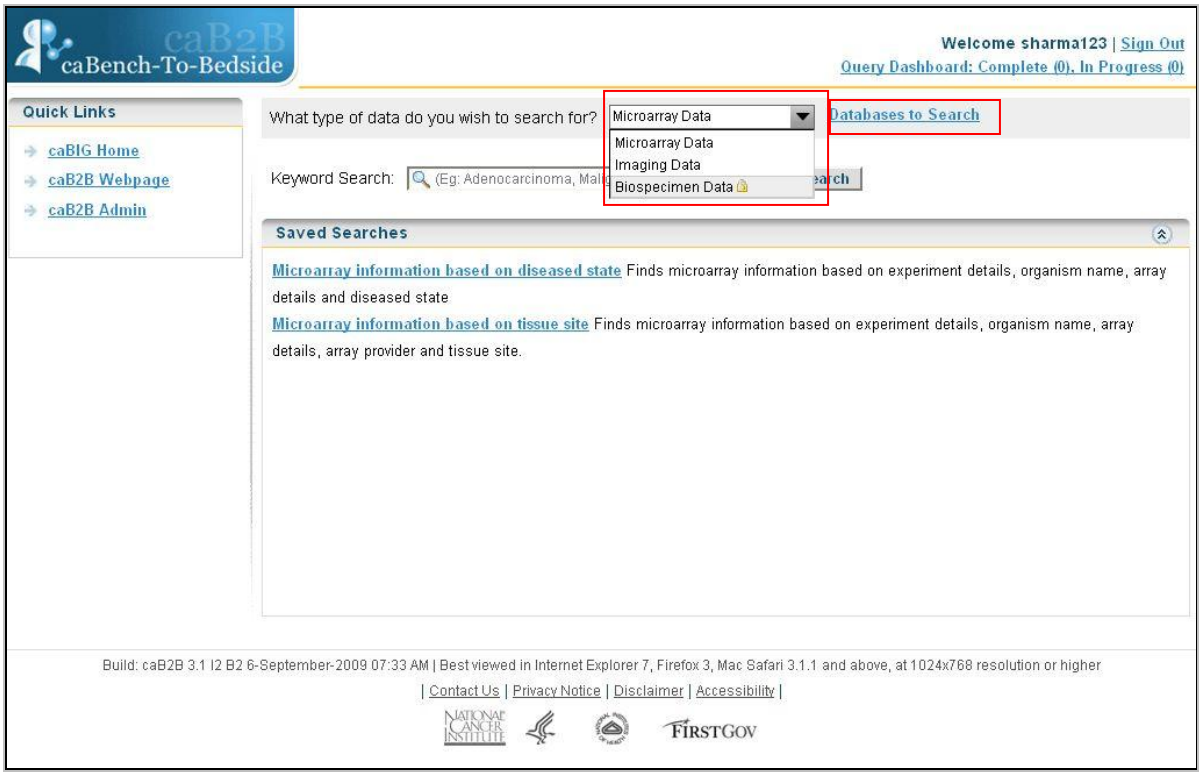


Figure A.1. Select data type

2. Click **Databases to search** and select **Thomas Jefferson University's** *caTissue Suite* instance for query (refer to *Figure 2.2*).

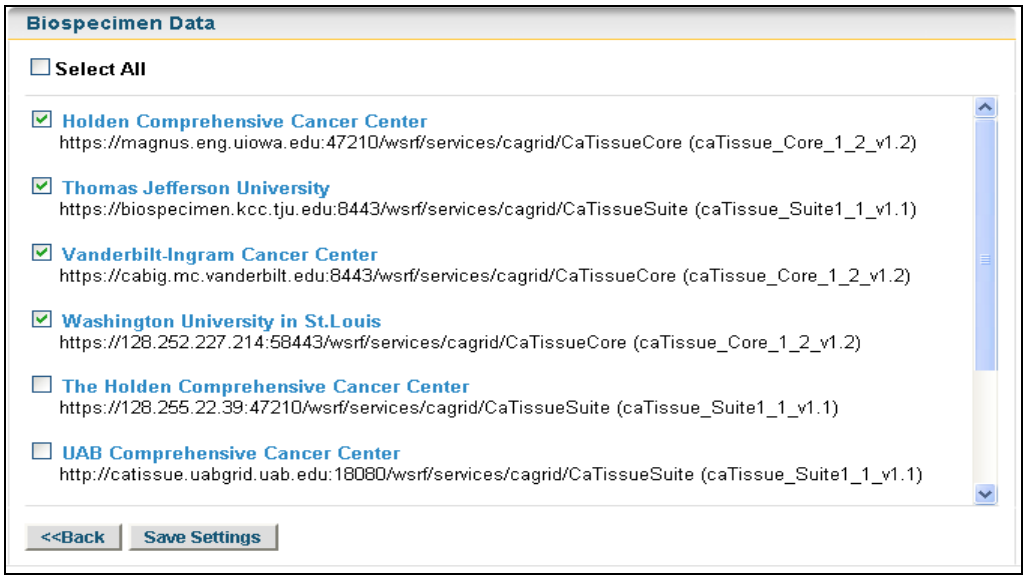


Figure A.2. Databases to Search

3. In the **Keyword Search** text box, enter ***Melanoma***.
4. Click **Search** (refer to Figure A.4).

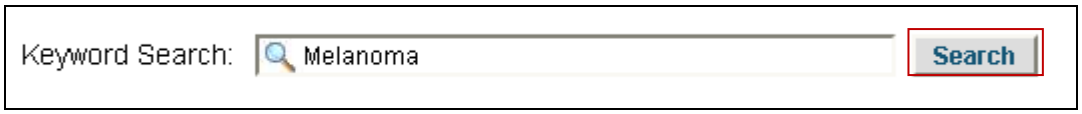
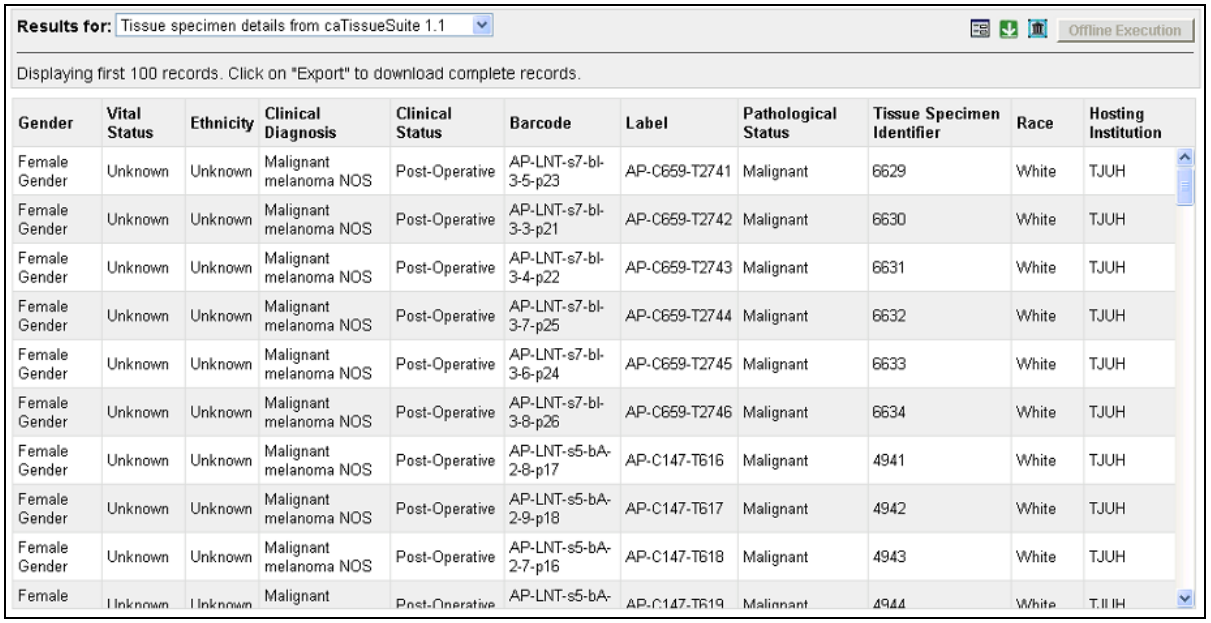


Figure A.3. Keyword Search

Application navigates to the results page.



Gender	Vital Status	Ethnicity	Clinical Diagnosis	Clinical Status	Barcode	Label	Pathological Status	Tissue Specimen Identifier	Race	Hosting Institution
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-5-p23	AP-C659-T2741	Malignant	6629	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-3-p21	AP-C659-T2742	Malignant	6630	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-4-p22	AP-C659-T2743	Malignant	6631	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-7-p25	AP-C659-T2744	Malignant	6632	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-6-p24	AP-C659-T2745	Malignant	6633	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s7-bl-3-8-p26	AP-C659-T2746	Malignant	6634	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s5-bA-2-8-p17	AP-C147-T616	Malignant	4941	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s5-bA-2-9-p18	AP-C147-T617	Malignant	4942	White	TJUH
Female Gender	Unknown	Unknown	Malignant melanoma NOS	Post-Operative	AP-LNT-s5-bA-2-7-p16	AP-C147-T618	Malignant	4943	White	TJUH
Female	Unknown	Unknown	Malignant	Post-Operative	AP-LNT-s5-bA-	AP-C147-T619	Malignant	4944	White	TJUH

Figure A.4. Keyword Search Result

5. Change the query in the **Results for** dropdown to view the results for another query

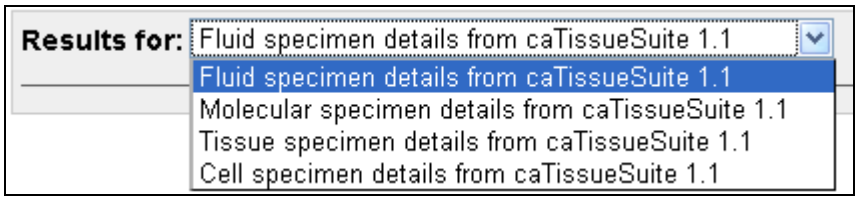


Figure A.5. Multiple Keyword Queries

6. Click  to export the results as a csv file.

Saved Searches

To find *malignant Melanoma tissue specimens* you can use the Saved Searches. Follow the steps given below to execute the search:

1. Select **Biospecimen data** from **What type of data do you wish to search for?** dropdown(refer to ***Error! Reference source not found.***)
2. Click on **Databases to Search** and select **Thomas Jefferson University's** *caTissue Suite* instance for query.(refer to *Databases to Search*)
3. Click on **Tissue specimen details** from the saved searches panel.

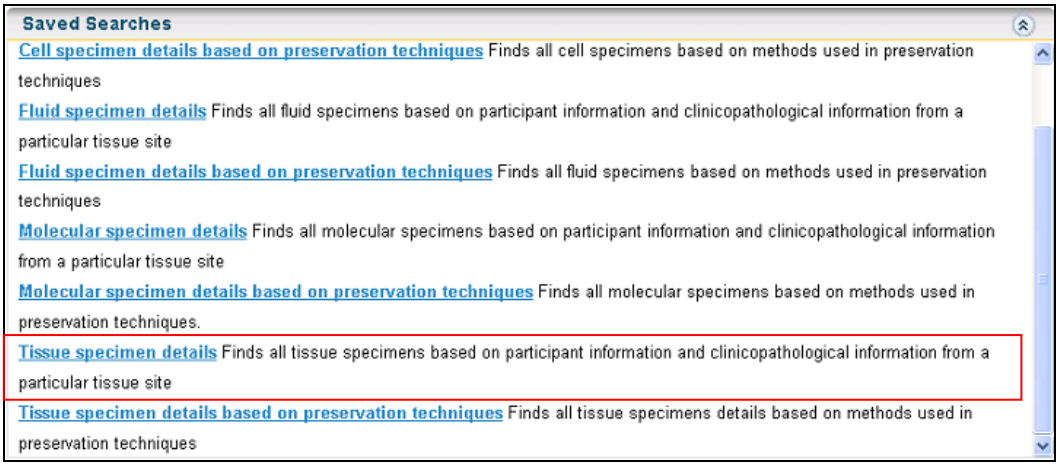


Figure A.6. Select Saved Search

Application navigates to the **Define Limits** page.

4. Define limit on **Clinical Diagnosis** contains Melanoma and **Pathological Status** In *Malignant.*

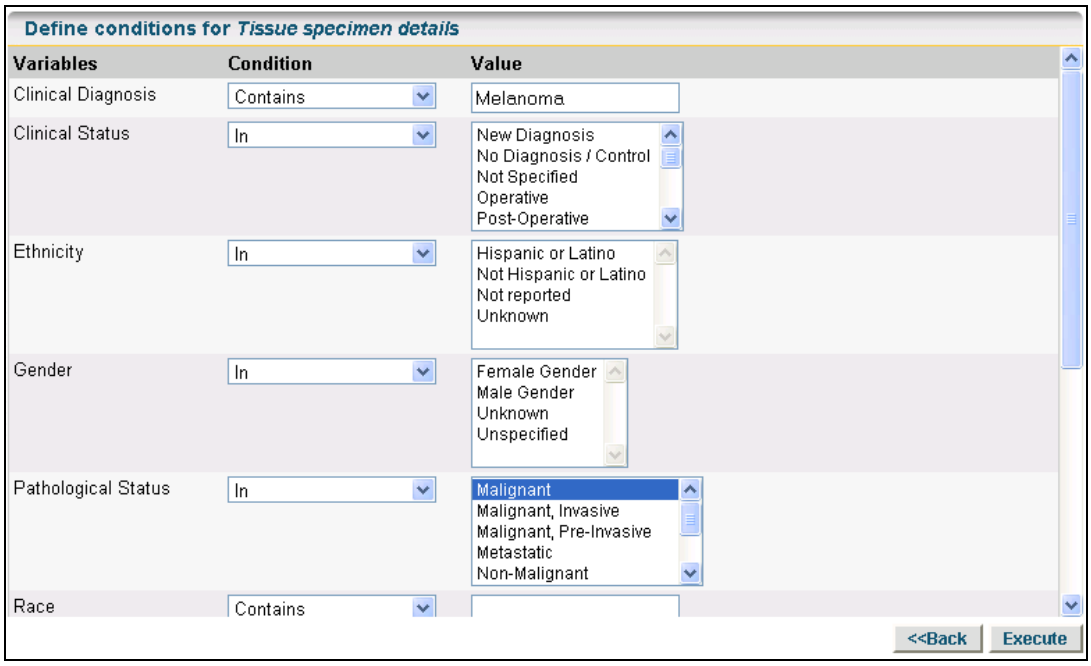
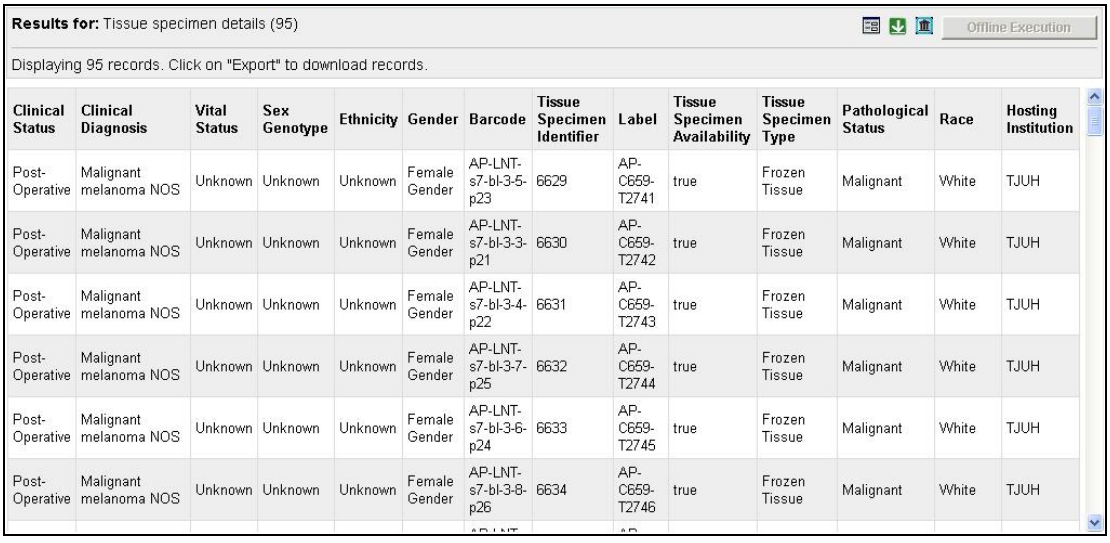


Figure A.7. Define Limits

5. Click **Execute.**

Application navigates to the results page.



Clinical Status	Clinical Diagnosis	Vital Status	Sex Genotype	Ethnicity	Gender	Barcode	Tissue Specimen Identifier	Label	Tissue Specimen Availability	Tissue Specimen Type	Pathological Status	Race	Hosting Institution
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-5-p23	6629	AP-C659-T2741	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-3-p21	6630	AP-C659-T2742	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-4-p22	6631	AP-C659-T2743	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-7-p25	6632	AP-C659-T2744	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-6-p24	6633	AP-C659-T2745	true	Frozen Tissue	Malignant	White	TJUH
Post-Operative	Malignant melanoma NOS	Unknown	Unknown	Unknown	Female Gender	AP-LNT-s7-bl-3-8-p26	6634	AP-C659-T2746	true	Frozen Tissue	Malignant	White	TJUH

Figure A.8. Saved Search Results

6. Click  to export the results as a csv file

Appendix B Define Limit: Operators and Values

This appendix explains the various operators available for query. It also explains how to specify values while defining limits on a query.

The following table explains the different operators and provides examples as to how values are to be specified.

Operator	Data types for which applicable	Sample condition	Expected Results
Equals	Numeric Date String	Tissue Site **equals** "Cerebellum"	Returns all specimens with tissue site only Cerebellum and not cerebellum
Not equals	Numeric Date String	Tissue Site **not equals** "Cerebellum"	Returns all specimens with tissue site other than Cerebellum
Is null	Numeric String Date	Experiment description is **null**	Returns all experiments which do not have any description
Is not null	Numeric Date	Experiment title is **not null**	Returns all Experiments whose title is specified
In	Numeric String Enumerated	Pathological Status **in** Malignant	Returns all specimens whose pathological status is malignant
Not in	Numeric String Enumerated	Pathological Status **not in** Malignant	Returns all specimens whose pathological status is not malignant
Starts with	String	Tissue Site **starts with** pr	Returns all specimens whose tissue site starts with pr like prostate Does not return the specimen with tissue site ovary

Ends with	String	Clinical Diagnosis **ends with** noma	Returns all specimens whose clinical diagnosis ends with noma like adenoma, carcinoma and melanoma. Does not return specimen with diagnosis gangrene
Contains	String	Clinical Diagnosis **contains** noma	Returns all specimens whose clinical diagnosis is adenoma, carcinoma, and melanoma. Does not return specimen with clinical diagnosis meningioma

- For attributes with enumerated values and Boolean attributes, clear a value by clicking on the value with the CTRL key pressed.
- If you use the **In** operator for a non-enumerated attribute, you can specify multiple values as follows:
    - Separate multiple values using a comma. For example, to specify the constraint **Clinical Diagnosis IN adenoma, carcinoma, melanoma**, you should type the value as **adenoma, carcinoma, melanoma.**
- For attributes with enumerated values, you can select multiple values by selecting the value with the CTRL key pressed.

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